International Urology and Nephrology (2022) 54:1787–1792
https://doi.org/10.1007/s11255-022-03244-y

UROLOGY - ORIGINAL PAPER

Technique, outcome and changes in prostate dimensions in patients with urinary retention managed by aquablation

Chi-Hang Yee[1] · Sui-Fan Tang[1] · Steffi Kar-Kei Yuen[1] · Chi-Kwok Chan[1] · Jeremy Y. C. Teoh[1] · Peter K. F. Chiu[1] · Chi-Fai Ng[1]

Received: 21 February 2022 / Accepted: 4 May 2022 / Published online: 27 May 2022

Abstract

Purpose This study aimed to investigate the functional and urodynamic outcome of Aquablation in patients with acute urinary retention (AUR) on catheters.

Methods Men aged 50–70 who failed medical treatment of BPO with AUR failing to wean off urethral catheter were recruited to undergo Aquablation. Individuals were assessed pre-operatively and at 3 and 6 months after surgery. The primary outcome was defined by the success rate of weaning off catheter. Secondary outcomes were measured by a change in prostate size, symptom scores and urodynamic parameters.

Results Twenty patients underwent Aquablation between June 2019 and September 2020. Mean duration of the urethral catheter in-situ was 5.9 ± 4.9 weeks and mean prostate size of the cohort pre-operatively was 60.8 ± 15.8 cc. A second pass Aqaublation treatment was performed in 14 patients. Five patients failed to wean off the catheter on the first attempt after surgery, requiring another attempt 1 week later which were all successful. At 3 months after the operation, a significant reduction in prostate volume was observed (60.8 ± 15.8 cc vs 24.9 ± 10.3 cc, $p < 0.001$). No change in international index of erectile function (IIEF) was found (baseline: 16.1 ± 5.8; 3-month: 14.9 ± 6.4; $p = 0.953$). Mean bladder outlet obstruction index was 14.2 ± 23.0 at 6 months upon urodynamic assessment with 75% of patients had a resolution of detrusor overactivity. Reduction in prostate length was found to be more significant than a reduction in width and height after Aquablation ($R = 0.693$, $p = 0.039$).

Conclusion From the early data of a single centre, Aquablation was shown to provide a consistent improvement in symptoms, uroflowmetry and urodynamic parameters in patient with a urethral catheter. Results from our study suggest that improvement from Aquablation is reproducible in patients with AUR.

Keywords Acute urinary retention · Benign prostatic obstruction · Robotics · Waterjet ablation

Introduction

Lower urinary tract symptoms (LUTS) are common and the prevalence of LUTS secondary to benign prostatic enlargement (BPE) increases with age [1]. It was estimated that 10% of men in their seventies and a third in their eighties would have acute urinary retention (AUR) in the following 5 years [2]. Once men had AUR secondary to BPE, 38.1% to 52.0% failed to wean off catheter with medical therapy alone [3]. Patients failing trial without catheter (TWOC) conventionally would be treated with transurethral resection of the prostate (TURP) to relieve the obstruction at the bladder outlet. However, TURP historically was associated with a number of complications including retrograde ejaculation (53%–75%) and erectile dysfunction (3.4%–32%) [4]. Aquablation was first reported in 2016 to be a robotically executed, surgeon-guided, ultrasound-imaging aided waterjet treatment of BPE [5]. Subsequently the WATER trial and WATER II trial have demonstrated that Aquablation was a safe and effective treatment option for patients suffering from LUTS/BPE [6, 7]. However, the report was scarce in the literature on Aquablation with respect to patients with AUR, and previous evidence of TURP on patients with AUR

✉ Chi-Hang Yee
yeechihang@surgery.cuhk.edu.hk

[1] S.H. Ho Urology Centre, Division of Urology, Department of Surgery, Prince of Wales Hospital, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong

demonstrated greater morbidity and mortality in this group of patients [8]. The current study investigated the outcome of Aquablation in patients with AUR on catheters, detailing the functional and urodynamic outcome.

Methods

This was a prospective observational study on consecutive patients with urinary retention who underwent Aquablation between June 2019 to September 2020. Men aged between 50 to 70 years old who failed medical treatment of their benign prostatic obstruction (BPO) with a urethral catheter in-situ were recruited into the study. The study excluded individuals who (i) had active urinary tract infection; (ii) who were on anti-coagulation; (iii) who had bladder pathology including bladder stone and bladder cancer; (iv) who had confirmed neurological pathology that would alter their detrusor or sphincter function; (v) who had a prior surgical intervention to the prostate; and (vi) who had prostate cancer. The study protocol was approved by the local institutional ethics review board (CREC-2019.043) and was conducted in accordance with the ethical standards of the Helsinki Declaration of 1975 and its later versions. Written informed consent was obtained from all patients for study enrolment.

Operating surgeons in the trial were experienced surgeons with more than 500 transurethral resections performed in the past. Before the commencement of the trial, training in Aquablation was provided to the surgeons by means of online training, physical didactic lecture as well as cadaveric hands-on training. The AquaBeam™ (PROCEPT BioRobotics, Redwood Shores, CA, USA) system was used for the surgical water ablation of the prostate (Supplementary video). The procedure was carried out using perioperative antibiotic prophylaxis, according to the local resistance profile. The patient was placed in the dorsal lithotomy position. With real-time prostate visualization using a transrectal ultrasound and cystoscope, the surgeon marked the target resection contour with the AquaBeam Conformal Planning Unit. The ablation of tissue was robotically executed using a high-velocity waterjet to resect adenomatous tissue while avoiding the verumontanum and ejaculatory ducts. Treatment length, sweeping angle and depth were adjusted according to individual prostate morphology. According to the ultrasonic images of the prostate after Aquablation, a second treatment pass could be added to ensure adequate clearance of the obstructing tissue. Bipolar transurethral cauterization using a loop electrode was performed after Aquablation for haemostasis. After the procedure, a three-way Foley catheter was inserted and bladder irrigation was commenced with traction application. Post-operative management was per conventional TURP protocol. Bladder irrigation and urethral catheter were taken off from patients in sequence.

All recruited patients were assessed with a urodynamic study before Aquablation surgery. Patients were followed up at 3 months and 6 months. Serum prostate-specific antigen (PSA), prostate size assessment by transrectal ultrasound and erectile function assessment by International Index of Erectile Function (IIEF) were assessed pre-operatively and during post-operative follow-ups. After the patients had successfully weaned off their urethral catheter, symptom assessment by the validated Chinese version of the International Prostate Symptom Score (IPSS) and Overactive Bladder Symptom Score (OABSS) was done during post-operative follow-ups. Another set of the urodynamic study was performed at 6 months for evaluation of detrusor function and outflow obstruction. Bladder outlet obstruction index (BOOI) and bladder contractility index (BCI) were defined according to the suggestion of the International Continence Society [9]. The primary outcome was the success rate of weaning off catheter after Aquablation. Several other variables were measured as secondary outcomes, which included changes in prostate dimensions and size after Aquablation, post-operative symptom scores and post-operative urodynamic parameters.

Statistical analysis was performed using SPSS 26.0 (IBM Corp., Armonk, NY, USA). Post-operative changes in continuous variables were compared by t test. Comparison of more than 2 parameters was performed by 1-way ANOVA test and linear regression was performed by Pearson correlation test. A p-value of < 0.05 was regarded as significant.

Results

A total of 20 patients underwent Aquablation with AquaBeam™ over the study period (Table 1). All the patients failed medical treatment of BPO (all patients had alpha blockers and 2 patients had an additional 5-alpha reductase inhibitor) and were on urethral catheter before Aquablation treatment. In the cohort, 65% of the patients had catheter in-situ for more than 4 weeks before surgery. Before surgery, all patients failed to initiate meaningful voiding during the urodynamic study. As a result, maximal detrusor pressure (Pdet) instead of BCI was used to reflect the detrusor function. The mean prostate size was 60.8 ± 15.8 cc. Patients with PSA density > 0.20 ng/ml^2 opted for further investigation to rule out prostate cancer after Aquablation. At 3 months, 7 patients remained to have a PSA density > 0.20 ng/ml^2. None of them was found to have prostate cancer in subsequent investigations. Two patients were on 5 alpha-reductase inhibitor because of recurrent haematuria related to their vascular prostate.

Table 1 Baseline characteristics of the patients

Characteristics	
Mean age (years) ± SD	66.4 ± 4.4
Mean BMI (kg/m^2) ± SD	23.6 ± 2.6
Urinary retention (n)	20 (100%)
Mean duration of Foley catheter (weeks) ± SD	5.9 ± 4.9
Mean prostate size (cc) ± SD	60.8 ± 15.8
Mean PSA (ng/ml) ± SD	12.4 ± 7.6
Mean maximal Pdet (cmH2O) ± SD	84.5 ± 28.2
Presence of detrusor overactivity (*n*)	4
Mean IIEF ± SD	16.1 ± 5.8
Patients on 5ARI (*n*)	2 (10%)

SD standard deviation, *PSA* prostatic specific antigen, *Pdet* detrusor pressure, *IIEF* international index of erectile function, *5ARI* 5 alpha-reductase inhibitor

Table 2 laid out the peri-operative details of the current cohort. While the actual Aquablation time was all less than 10 min, the mean total operation time was 70.3 ± 15.8 min because the time for equipment setup, treatment zone planning and haemostasis were taken into account. A second pass of Aquablation treatment was performed on 14 patients. However, not all second passes were executed from the bladder neck to the prostate apex. Depending on the individual prostate ultrasonic image, some of the second passes just focused on the area with a significant amount of residual tissue. Two patients required transfusion after surgery in the early phase of the study. Five patients failed to wean off the urethral catheter on the first attempt when residual urine was found to be more than 150 ml, and a second attempt was arranged 7 days later. The two Clavien-Dindo grade 3 complications referred to two patients requiring cystoscopy and haemostasis (on post-operative Day 0 and Day 7) after the index operation, at the same time with transfusion given during hospital stay. The four Clavien-Dindo grade 2 complications were readmission after surgery due to urinary tract infection and haematuria, which were managed conservatively without the need for a transfusion.

The post-operative outcomes were listed in Table 3. All patients have shown a reduction in prostate size when compared with pre-operative data (Pre-op mean: 60.8 ± 15.8 cc; Post-op 3-month mean: 24.9 ± 10.3 cc; $p < 0.001$). Erectile function as reflected by IIEF was maintained after the surgery and retrograde ejaculation was observed in 25% of the patients at 3 months. Sustained symptoms improvement in IPSS and OABSS was observed at 6 months. Similarly,

Table 2 Peri-operative details

Peri-operative parameters		
Mean total operative time (mins) ± SD	70.3 ± 15.8	
Mean actual Aquablation time (s) ± SD	356.8 ± 143.4	
Number of passes during Aquablation (*n*)		
1	9	
2	11	
Patients using median lobe mode during Aquablation (*n*)	14	
Mean Hb level (g/dL) ± SD		
Pre-operative	13.8 ± 1.1	
Post-operative	12.9 ± 1.7	$p = 0.013$
Need of transfusion (*n*)	2	
Patients successfully weaning off Foley catheter (*n*)		
On 1st attempt	15	
On 2nd attempt	5	
Mean total bladder irrigation time (hours) ± SD	26.9 ± 12.5	
Mean Foley in-situ duration (days) ± SD	4.9 ± 3.6	
Mean RU upon discharge from hospital (ml) ± SD	60.0 ± 50.7	
Mean pain score upon discharge from hospital ± SD	2.0 ± 1.9	
Mean duration of hospital stay (days) ± SD	3.9 ± 2.1	
30-day complication (Clavien-Dindo Grade) (*n*)		
Grade 1	0	
Grade 2	4	
Grade 3	2	
Grade 4	0	
Grade 5	0	

SD standard deviation, *Hb* haemoglobin

Table 3 Outcome of aquablation

Parameters	Baseline	3 months	6 months	*p* value
Mean prostate size (cc) ± SD	60.8 ± 15.8	24.9 ± 10.1	24.9 ± 10.3	< 0.001[#]
Mean PSA (ng/ml) ± SD	12.4 ± 7.6	5.1 ± 2.9	5.7 ± 3.7	< 0.001[#]
Mean IIEF ± SD	16.1 ± 5.8	14.9 ± 6.4	16.6 ± 7.1	0.953[#]
Mean IPSS ± SD	–	5.8 ± 5.5	6.9 ± 8.5	0.826
Mean QoL score ± SD	–	1.9 ± 1.2	1.7 ± 1.1	0.192
Mean OABSS score ± SD	–	3.8 ± 2.7	2.8 ± 1.9	0.066
Mean Qmax (ml/s) ± SD	–	20.2 ± 7.6	17.6 ± 7.3	0.229
Mean RU (ml) ± SD	–	60.1 ± 25.2	22.3 ± 20.4	< 0.001
Retrograde ejaculation (n)	0	5	5	–
Mean PdetQmax (cmH2O) ± SD	–	–	41.4 ± 19.0	–
Mean BOOI ± SD	–	–	14.2 ± 23.0	–
Mean BCI ± SD	–	–	109.0 ± 30.7	–
Presence of detrusor overactivity (*n*)	4	–	4	–

SD standard deviation, *PSA* prostatic specific antigen, *IIEF* international index of erectile function, *IPSS* international prostate symptom score, *QoL* quality of life, *OABSS* overactive bladder symptom score, *Qmax* maximal voiding velocity, *RU* residual urine, *PdetQmax* maximal detrusor pressure at maximal voiding velocity, *BOOI* bladder outlet obstruction index, *BCI* bladder contractility index

[#]*p* value signifies comparison of 3-month value against pre-operative value

uroflowmetry parameters were satisfactory in both 3-month and 6-month assessment. Upon urodynamic study assessment, the mean BOOI was 14.2 ± 23.0 which was less than 20 per definition of unobstructed BOOI [10]. However, 1 patient was found to have BOOI > 40 after the procedure. Four patients in our series were found to have a hypocontractile bladder (BCI < 100), and yet all of them were still able to wean off Foley catheter after Aquablation. Three patients out of four had a resolution of their detrusor overactivity after surgery. However, another three patients were found to have de novo detrusor overactivity after Aquablation at the 6-month urodynamic study. Changes in prostate dimensions before and after Aquablation were highlighted in Fig. 1, which showed the reduction in prostate length was more than width and height on 1-way ANOVA analysis ($p = 0.0004$). Pearson correlation found the reduction in prostate length after Aquablation contributed to the final reduction in prostate volume rather than width and height (Length: $R = 0.693$, $p = 0.039$; Width: $R = 0.257$, $p = 0.504$; Height: $R = 0.6064$, $p = 0.0834$).

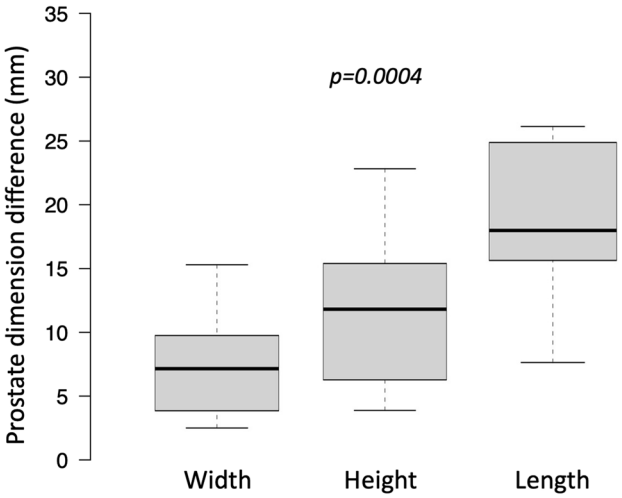

Fig. 1 Boxplot of the mean change in prostate dimensions before and after aquablation at 3 months

Discussion

Conventional TURP has been the gold standard of surgical management of benign prostate obstruction, and yet not without its limitation with respect to prostate size and peri-operative complications(11). Numerous novel techniques emerge to either achieve similar clinical outcomes as TURP while reducing side effects such as incontinence or sexual dysfunction, or to avoid general anaesthesia for the increasing cohort of elderly. Aqaublation removes prostatic parenchymal tissue through a heat-free mechanism of hydrodissection, representing one of the latest applications of robotic technology in urology and an effort to minimize treatment side effects [12]. Recent series on Aquablation involved mostly patients without a catheter and few were accompanied by urodynamic assessment [6, 13–15]. As patients with AUR represents a specific group of patients with more comorbidities and poorer functional outcome [16], our study provided a detailed account of Aquablation in patients on the catheter with outcomes in urodynamic parameters.

In the current cohort, the mean duration of catheter in-situ time before Aquablation was 5.9 weeks. This is comparatively longer than the practice from a survey among French urologists, which reported the execution of an elective TURP after a median of 8 days catheterization and 5.7% had immediate surgery [17]. Such time lag between the confirmation of refractory retention and Aquablation in our series was partially contributed by the COVID-19 pandemic, during which elective surgery service in our centre was tremendously reduced for benign surgical conditions. As bacteraemia is more common after 3 days of urethral catheterization due to bacterial colonization [18], this could account for the relatively longer mean hospital stay in our series when compared with Gilling et al. (1.4 days) [6] and Whiting et al. (1.8 days). However, the percentage of Clavien-Dindo Grade 1 to 2 complications was similar (Gilling et al. 50.0%, Whiting et al. 18.2%) [6, 14].

Our current series reflected the initial experience of Aquablation. Similar to Misrai et al. [15] and Whiting et al. [14], we all shared episodes of Grade 3 complication in which patients were required to undergo cystoscopy and haemostasis after the initial procedure in the early phase of the learning curve. The difficulty in haemostasis came from the suboptimal cystoscopic view after Aquablation, as well as the inaccurate assessment of the extent of the bleeding area early in the series. A few modifications in our technique have helped decrease the risk of bleeding in the later phase of the series: (1) When using the loop electrode for haemostasis and final touch up, we extended the cauterization area from just the bladder neck to including the prostate bed as well. Instead of cauterizing the superficial fluffy tissue after Aquablation, we went deep into the prostate bed to look for any significant bleeders. (2) The extent of the second pass of Aquablation was changed from full length (bladder neck to apex) to focusing only on the region with suspected significant residual prostate tissue. Both of these manoeuvres have prevented further need for a second operation for haemostasis, as well as the need for transfusion in the rest of our series.

While the results of the current series came from an early experience of Aquablation, we could appreciate that the functional outcomes of Aquablation have been quite consistent across different series in the literature. Whiting et al. reported the 3-month mean maximal velocity (Qmax) to be 22.3 ml/s in their series of mostly patients without a urethral catheter. In the WATER II trial, the Qmax at 3 months was about 20 ml/s. We reported our mean Qmax at 3 months to be 20.2 ml/s. Furthermore, the mean IPSS of our series was 5.8 at 3 months and 6.9 at 6 months, which was comparable with Whiting et al. (mean 3-month IPSS 6.7) [14]. These data have demonstrated that from Aquablation we could expect a standardized outcome with a standardized operating time. Considering Aquablation provides the lowest operative time across different prostate volumes among multi-surgical techniques, so far it is one of the most efficient ways for the treatment of BPO.

It has been recognized that the impact of BPO on symptoms and voiding functions depends not only prostate size but also the dimensions of the prostate [19]. Based on the concept of presumed circle area ratio Watanabe et al. suggested that a higher prostate height to weight ratio would result in a higher degree of BPO [19]. However, the final pressure on the urethra with respect to the horizontal prostate dimensions would still depend on the elasticity of the prostate surgical capsule [20]. Ko et al. showed that the longer the length of the prostate and hence the prostatic urethral length (PUL), the higher IPSS score it would be [21]. Furthermore, a longer prostatic urethral length carried a higher risk of requiring surgical treatment for BPO (22). Our study has provided detailed data on the change in prostate dimensions after Aquablation, demonstrating the significant reduction in prostate length. It is thus transferred into an improvement in symptoms as well as urodynamic parameters, which is an accurate representation of function showing a low mean BOOI after Aquablation in our series.

The current study has the limitation of a relatively small series of patients. As a result, the complications in the early phase of the learning curve may result in an overestimation of the overall complication rate. However, our series had a detailed account of the post-operative outcome in terms of urodynamic parameters and prostate dimensions, which are scarce in the current literature. Data on this unique and yet common subset of patients on urethral catheter would provide important supplementary information on the performance of Aquablation.

Conclusions

Aquablation provided a consistent improvement in symptoms, uroflowmetry and urodynamic parameters in patients with a urethral catheter. Short term differences between this group of patients and patients with LUTS only with respect to post-operative recovery include a longer length of hospital stay and a longer duration of having the catheter in-situ. The complication profile from the current series showed that while Aquablation is not necessarily a better procedure than TURP, it is a feasible alternative when the equipment is available. Challenges in haemostasis can be overcome by modification in surgical techniques. Significant reduction in prostate length after Aquablation may account for the standardized relief in obstruction from benign prostatic enlargement. Results from our series suggest that this technique is reproducible by centres early in their learning curve and a similar improvement can be anticipated in patients with AUR.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11255-022-03244-y.

Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

References

1. Yee CH, Chan CK, Teoh JYC, Chiu PKF, Wong JHM, Chan ESY et al (2019) Survey on prevalence of lower urinary tract symptoms in an Asian population. Hong Kong Med J 25(1):13–20
2. Fitzpatrick JM, Kirby RS (2006) Management of acute urinary retention. BJU Int 97(Suppl 2):16–20 (**discussion 1-2**)
3. Zeif HJ, Subramonian K (1996) Alpha blockers prior to removal of a catheter for acute urinary retention in adult men. Cochrane Database Syst Rev 2009(4):CD006744
4. Rassweiler J, Teber D, Kuntz R, Hofmann R (2006) Complications of transurethral resection of the prostate (TURP)–incidence, management, and prevention. Eur Urol 50(5):969–979 (**discussion 80**)
5. Gilling P, Reuther R, Kahokehr A, Fraundorfer M (2016) Aquablation - image-guided robot-assisted waterjet ablation of the prostate: initial clinical experience. BJU Int 117(6):923–929
6. Gilling P, Barber N, Bidair M, Anderson P, Sutton M, Aho T et al (2018) WATER: a double-blind, randomized, controlled trial of aquablation((R)) vs transurethral resection of the prostate in benign prostatic hyperplasia. J Urol 199(5):1252–1261
7. Yafi FA, Tallman CT, Seard ML, Jordan ML (2018) Aquablation outcomes for the U.S. cohort of men with LUTS due to BPH in large prostates (80–150). Int J Impot Res 30(5):209–14
8. Pickard R, Emberton M, Neal DE (1998) The management of men with acute urinary retention. National prostatectomy audit steering group. Br J Urol 81(5):712–20
9. Drake MJ, Doumouchtsis SK, Hashim H, Gammie A (2018) Fundamentals of urodynamic practice, based on international continence society good urodynamic practices recommendations. Neurourol Urodyn 37(S6):S50–S60
10. Abrams P (1999) Bladder outlet obstruction index, bladder contractility index and bladder voiding efficiency: three simple indices to define bladder voiding function. BJU Int 84(1):14–15
11. Yee CH, Wong JH, Chiu PK, Chan CK, Lee WM, Tsu JH et al (2015) Short-stay transurethral prostate surgery: a randomized controlled trial comparing transurethral resection in saline bipolar transurethral vaporization of the prostate with monopolar transurethral resection. Asian J Endosc Surg 8(3):316–322
12. Madersbacher S, Roehrborn CG, Oelke M (2020) The role of novel minimally invasive treatments for lower urinary tract symptoms associated with benign prostatic hyperplasia. BJU Int 126(3):317–326
13. Desai M, Bidair M, Bhojani N, Trainer A, Arther A, Kramolowsky E et al (2020) Aquablation for benign prostatic hyperplasia in large prostates (80–150 cc): 2-year results. Can J Urol 27(2):10147–10153
14 Whiting D, Ng KL, Barber N (2021) Initial single centre experience of aquablation of the prostate using the AquaBeam system with athermal haemostasis for the treatment of benign prostatic hyperplasia: 1-year outcomes. World J Urol. https://doi.org/10.1007/s00345-020-03534-z
15. Misrai V, Rijo E, Zorn KC, Barry-Delongchamps N, Descazeaud A (2019) Waterjet ablation therapy for treating benign prostatic obstruction in patients with small- to medium-size glands: 12-month results of the first French aquablation clinical registry. Eur Urol 76(5):667–675
16. Teoh JY, Chan CK, Wang MH, Leung CH, Chan ES, Chiu PK et al (2019) Transurethral resection of prostate for acute urinary retention is linked to shorter survival in younger men. Asian J Androl 21(5):468–472
17 Desgrandchamps F, De La Taille A, Doublet JD, RetenFrance Study G (2006) The management of acute urinary retention in France: a cross-sectional survey in 2618 men with benign prostatic hyperplasia. BJU Int. 97(4):727–33
18 Mebust WK, Holtgrewe HL, Cockett AT, Peters PC (1989) Transurethral prostatectomy: immediate and postoperative complications. A cooperative study of 13 participating institutions evaluating 3885 patients. J Urol 141(2):243–7
19. Watanabe T, Miyagawa I (2002) New simple method of transabdominal ultrasound to assess the degree of benign prostatic obstruction: size and horizontal shape of the prostate. Int J Urol 9(4):204–209
20. Watanabe H (1998) New concept of BPH: PCAR theory. Prostate 37(2):116–125
21. Ko YH, Kim TH, Song PH, Kim BH, Kim BS, Kim KH et al (2017) Structural variations of the prostatic urethra within the prostate predict the severities of obstructive symptoms: a prospective multicenter observational study. Urology 104:160–165
22. Kim BS, Ko YH, Song PH, Kim TH, Kim KH, Kim BH (2019) Prostatic urethral length as a predictive factor for surgical treatment of benign prostatic hyperplasia: a prospective, multiinstitutional study. Prostate Int 7(1):30–34